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BOOK REVIEWS

The Teaching of Biology. By F. E. LLOYD AND M. A. BIGELOW. New York: Longmans, Green & Co. Pp. 491.

The book which is the subject of this review and Professor Ganong's *Teaching Botanist*, published in 1899, together represent the most extended and successful attempts at giving a full statement of the educational bearings of biology in the secondary schools. The *Teaching Botanist* has been and will continue to be a potent factor in presenting the opportunities and claims of biology. The new book mentioned is somewhat more pretentious in the topics treated in botany, and treats the field of zoölogy as well. The philosophical and practical discussions are so excellent that one can but wish that the teaching force of biology as a whole could appreciate and utilize them. They represent in a fairly complete way ideas as to the fundamentals of biological teaching, as those ideas are held by many of the most successful teachers of the subject. As has often been true concerning the statement of position of the advance guard, some time will be needed before all can come to appreciate this position. We are not likely to overestimate the value of such a statement, however, since, on the one hand, it helps greatly to remove real and supposed differences between those who are seeking to discover the proper tenets of the work in biology, and, on the other hand, offers definite and acceptable leadership to the larger number of teachers who expect to have prepared for them a statement of these things. Teachers of either class just mentioned can ill afford not to give this book a careful reading, and if such reading is done in anything like a general way, the book will be the means of giving quite an uplift to biological teaching. From this it does not follow that all teachers will be in entire agreement with all the ideas brought forth, but such is not essential to derivation of large benefits.

The first and second chapters in the first part by Professor Lloyd, and the fourth and twelfth chapters in the second part by Professor Bigelow, are upon the following topics, respectively: "The Value of Science, and Particularly of Biology, in Education," "Nature Study," "Animal Nature Study and Human Physiology in the Elementary School," and "The Teaching of Human Physiology in the Secondary Schools." Outside of these chapters each author's presentation may be organized in a general way under the three following heads: the values to accrue from a study of the subject in secondary schools, the principles that shall determine the organization of the course, and the outline of the course itself.

Concerning the first and second of these divisions, and the plan of the third, there is essential agreement on the part of the authors, though disagreement appears in some points. The primary benefit to be derived from biological study is not an æsthetic one, though æsthetic values do result. "The teacher of botany is not concerned with æsthetics," says the first author; while the second says: "The æsthetic value is, I believe, not secondary in its importance in education, but equal to those which I have grouped under 'practical' and 'intellectual.'" Neither author, however, would seek directly to obtain æsthetic values, and both recognize that such are valuable corol-

laries. It is recognized "that a more searching examination and better understanding of the significance of plants and their business will lead to richer fields of intellectual and emotional delights; and that a fuller knowledge of these organisms and their ways will furnish vastly more material for the play of the æsthetic imagination." A definite stand is taken against that sentimentalism which has often appeared in our books and more often in our practice, and which has been an adequate cause for the patronization we have sometimes received at the hands of our friends. Other values receiving full and justified indorsement are: the peculiar and unsurpassed advantages of both botany and zoölogy as disciplinary subjects; the informational content; utilitarian features of biological processes and their results; interest in and appreciation of living things; biological knowledge as a basis for further thought concerning evolution, and also as a basis for proper interpretation of certain sociological problems.

In determining the things that shall organize the course in botany or zoölogy there must be recognition of the present status of the subjects as actually taught in the high schools and also in the grades. "The formulation of an optimum standard is, however, one thing, and its general acceptance in the fullest sense another." Should we grant that teaching force and pupil's ability are practically uniform the country over (things far from being true), we should still find it necessary to vary our courses to suit different localities and conditions. Teachers' opinions vary widely and will continue to do so. In the experience of the reviewer, two teachers from large cities independently criticised the same outline in a laboratory guide. One said that the outline should have been omitted, since the work should have been done in the grades. The other said that in order to meet his needs more work of the kind in greater detail should have been introduced. It is not possible, therefore, for anyone to outline a single course that shall be adequate for the needs of all, or indeed for those of any large proportion of the pupils who are to study the subject. There are certain general principles that should be operative in determining the organization of the course. The course should be for the masses and not for those few who are to go to college, most assuredly not for those who may continue this work in college. Professor Bigelow suggests, as the best plan at present, a year's course consisting of one-half year of each subject. After discussing this course, he says: "All this, however, is merely suggesting a temporary compromise looking forward to the time when a unified course in biology will make it unnecessary and quite undesirable to draw any line between botany and zoölogy, as the present arrangement of separate textbooks and guides now practically requires in most high schools." Following this statement, and in answer to the objection that such a course would not meet college-entrance requirements, it is suggested that there be further courses in botany and zoölogy elective in the fourth year to those who expect to go to college. Such a plan was recently adopted by the high schools of Greater New York. Concerning the efficacy of this proposed arrangement of the work many will have important objections. It should be said, also, in this connection that any course that is best for the masses of high-school pupils should be accepted as an entrance requirement by the colleges.

Further considerations determining the organization of the course will be found by deciding what things will best realize the values mentioned above. What topics and what treatment will best develop intellectual power, give the best quality of information concerning plants and animals as living things and as related to our needs, and will best produce interest, happiness, and high ethical life. These things involve inclusion

of the various divisions of the subject arranged as a synthetic unit. Most teachers will welcome the clear stand taken with reference to the relative importance of these different phases of both botany and zoölogy, as stated for zoölogy by Professor Bigelow in the following: "The study of anatomy, gross and microscopical, is obviously the foundation for that of all other phases of zoölogy; for classification, physiology, embryology, and ecology rest upon a basis of structure." Of course, no teacher really conversant with his problem would teach morphology without constantly asking for interpretations in terms of function.

Preceding the course itself there is considerable discussion of the "type study" and so-called "logical" course, it being concluded that the difficulties of beginning with the lowest forms are such as to make it undesirable to do so. The courses that follow are essentially the same as have appeared elsewhere. The one for botany was published in *School Science* in May, 1902, as the Report of the Committee on a College Entrance Option in Botany, the committee having been appointed by the Society for Plant Morphology and Physiology. The course in zoölogy appeared in the *Teachers College Record*, Vol. II, No. 1, January, 1901. A review of these courses is unnecessary.

Each chapter of the book is accompanied by an excellent classified bibliography. Frequent footnote citations add authority to the statements made, and many other elements of excellence that cannot be included in a review assist in making the book indispensable to teachers of biology everywhere.

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A Modern School. By PAUL H. HANUS. New York: The Macmillan Co.
Pp. viii + 306.

One of the best methods of contributing to educational progress is a thorough examination and careful interpretation of tendencies in actual school work. A second method is that of setting forth in a constructive way guiding principles based on philosophical considerations and scientific experiment. Of the latter, Professor Dewey is probably the leading representative; of the former, Professor Hanus. Probably no man has a keener insight into educational tendencies, on the practical side, than Professor Hanus. The first chapter of the author's *Educational Aims and Educational Values* emphasizes that "preparation for complete living" calls for an active participation in the activities of life now. The present volume aims at a further development of his theme on the practical side. The demands of both society and the individual must be met. "A modern school can meet the legitimate demands of society only by adapting its aims, means, and methods to the changing needs of a progressive civilization." The emphasis is upon the practical, but the demands of the individual in his personal development are met by substituting for the general culture of earlier times a modern one. No one who carefully reads the signs of the times can fail to feel the demand that, to fulfil its function, the school must continually formulate new aims and use new methods. To point out these is the author's real contribution.

This volume consists of nine chapters which have appeared, in part or entire, as articles in six magazines. Chap. 1, under the title of the book, sets forth the central theme—the function of a modern secondary school. The modern school comprises